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FLOOD INSURANCE STUDY



**TOWN OF GRUNDY,
VIRGINIA
BUCHANAN COUNTY**



NOVEMBER 4, 1988



Federal Emergency Management Agency

COMMUNITY NUMBER - 510025

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWN OF GRUNDY, BUCHANAN COUNTY, VIRGINIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Town of Grundy, Buchanan County, Virginia. This information will be used by the Town of Grundy to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study represent a revision of the original analyses prepared by the Huntington District of the U. S. Army Corps of Engineers (COE) for the Federal Emergency Management Agency, under Inter-Agency Agreement No. IAA-H-10-77, Project Order No. 29. This work was completed in January 1981.

In this revision, the hydrologic analysis of Levisa Fork was updated by Resource Applications, Inc., for FEMA, under Contract No. EMW-C-0096; this work was completed in May 1984. The hydraulic analysis of Levisa Fork was updated by the Huntington District of the COE; this work was completed in February 1986. The floodway analysis of Levisa Fork was prepared by Dewberry and Davis on the basis of the updated hydrologic and hydraulic models; this work was completed in August 1987.

1.3 Coordination

On October 5, 1976, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of the FEMA, the Town of Grundy, and the COE (the study contractor). The purpose of the meeting was to explain the nature and purpose of the study, to identify the study streams, to establish the study limits, and to

discuss the methodology to be used and the concept of a floodway. During the course of the study, the Virginia Department of Highways and the Town Board of Grundy were contacted for information. On October 15, 1981, the results of the study were reviewed at a final CCO meeting attended by representatives of the FEMA, the town, and the COE.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Town of Grundy, Buchanan County, Virginia. The area of study is shown on the Vicinity Map (Figure 1).

The entire lengths of Levisa Fork and Slate Creek within the corporate limits were studied by detailed methods. Levisa Fork was revised on the basis of an updated hydraulic model calibrated to the April 1977 flood, an updated hydrologic model, and updated topographic information. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Portions of Three and Twenty Mile Branch, Newhouse Branch, Watkins Branch, and Dave Branch were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Town of Grundy.

2.2 Community Description

The Town of Grundy is located in the west-central portion of Buchanan County in southwestern Virginia, approximately 17 miles east of Elkhorn City, Kentucky, and approximately 48 miles west of Welch, West Virginia. It is situated at the junction of Slate Creek and Levisa Fork. Grundy is surrounded by the unincorporated areas of Buchanan County.

Buchanan County is in the Kanawha section of the Appalachian Plateau physiographic province. It is part of the richest coal producing area in the United States, with mining operations practically sustaining the entire economy.

Although termed a plateau, the area is extremely rugged, as the plateau surface has been intricately dissected by stream erosion. The streams form a random dendritic pattern with steeply sloped valleys and narrow crested ridges. Local relief ranges from 1,000 to 2,000 feet.

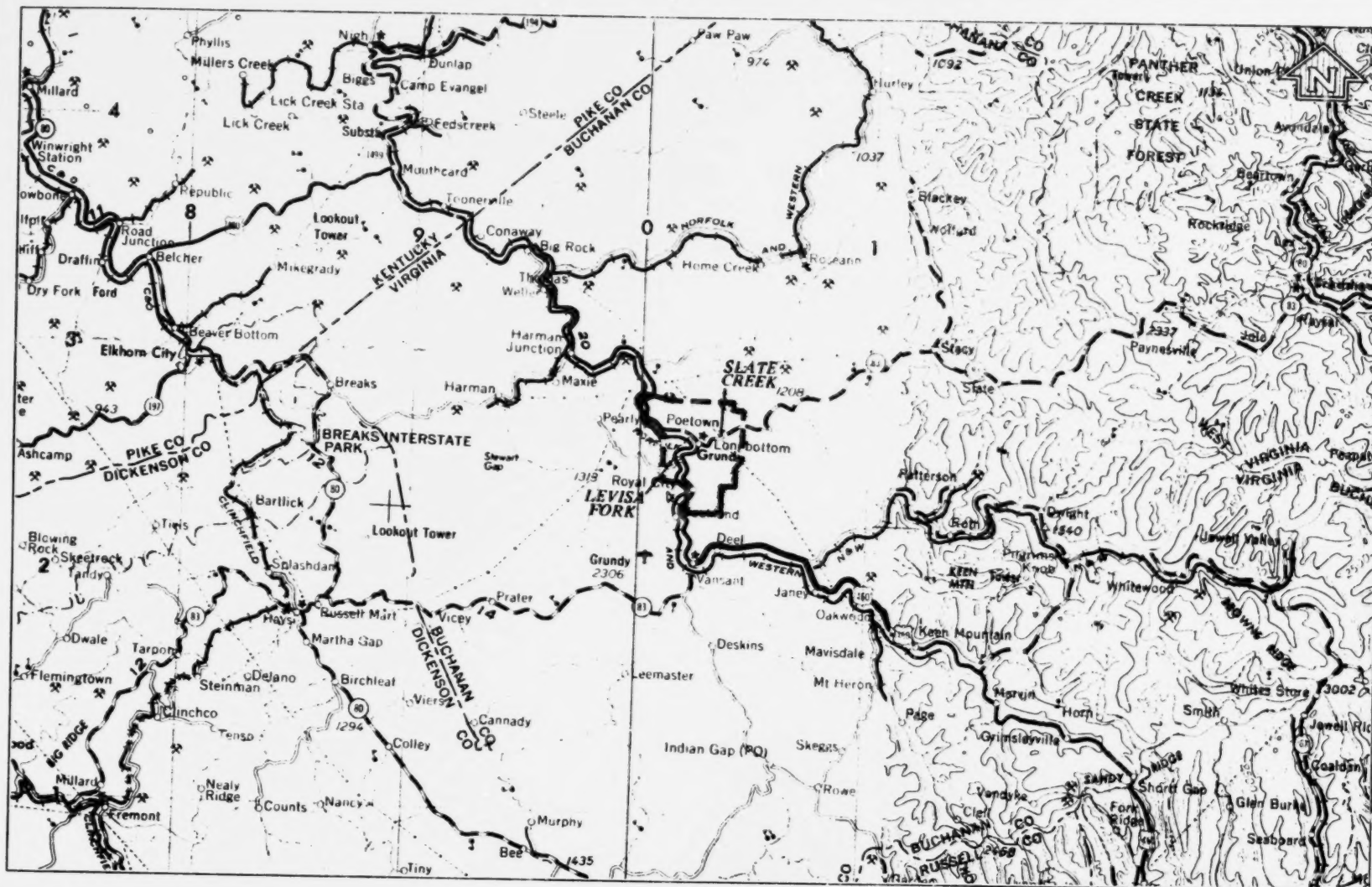


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

**TOWN OF GRUNDY, VA
(BUCHANAN CO.)**

APPROXIMATE SCALE



VICINITY MAP

Housing patterns, roads, and rail lines follow the streams, since construction elsewhere is generally infeasible. Because of the narrowness of the valley bottoms, rail lines follow one side of the bank of the stream and the highway or roadway follows the other side. Except for an occasional logging road or jeep trail, only a few roads emerge from the narrow valleys to cross a divide from the headwaters of one stream to the headwaters of another.

The county consists mainly of coal mining properties. About 87 percent of the land is forested and only 8 percent is farmland. Industrial development is slight (Reference 1).

The Grundy area is served by the Buchanan branch of the Norfolk and Western Railway, which was built to open the county's coal resources for mining and shipment in the early 1900's. Several sub-branches of this railroad follow tributaries to Levisa Fork, one extending down Levisa Fork into Pike County, Kentucky, while others follow tributaries to various parts of Buchanan County.

The county is traversed by U. S. Route 460, which, through most of the county, follows Levisa Fork. South of Grundy, U. S. Route 460 has been reconstructed as a modern divided highway.

The Grundy area, including adjacent valley slopes, occupies approximately six percent of Buchanan County's 508 square miles. As a result of its proximity to road and rail transportation and the developed resources of the county, Grundy accounts for a large portion of the total county population.

Grundy was established in 1858 as the county seat of Buchanan County. The population of the town was 2,054 in 1970 (Reference 2). The July 1976 population was estimated at 1,891, indicating an eight percent decrease since 1970 (Reference 3).

The annual precipitation ranges between 45 and 50 inches. Because of the mountainous terrain, there is a wide variation in rainfall during storms.

2.3 Principal Flood Problems

Approximately 75 percent of the flooding in Grundy occurs between December and March. Major streams in the area usually experience an annual spring flood. Smaller streams tend to flood after each intense thunderstorm throughout the year.

Grundy has a history of severe flooding problems from Slate Creek and Levisa Fork. Damage from floods has had a tremendous effect on the economy of the area. Approximately 90 percent of the structures in the town lie in a flood hazard area. Eight major floods have occurred since 1929, with the April 1977 flood being the flood of record.

The 1977 flood exceeded the previous maximum flooding level of the 1957 flood by approximately three feet. Three lives were lost and the estimated damage in the Grundy area was in the millions of dollars. The main downtown commercial area was inundated to a depth of approximately six feet. All local utilities were shut down due to excessive flood damage. The force of the water tore away store fronts, washed away several buildings, and completely destroyed several mobile home parks. In the downtown commercial area of Grundy, silt up to two feet deep and debris as much as five feet in depth piled around poles and corners of buildings. The 1977 flood at Grundy is estimated to have had a recurrence interval of slightly more than 100 years. In addition to those floods of 1957 and 1977, major floods occurred in 1929, 1946, 1958, 1963, 1967, and 1978.

Figures 2, 3, and 4 show the destruction that was caused by the April 1977 flood in the Grundy area.

2.4 Flood Protection Measures

The Town of Grundy has no existing or proposed local flood protection measures. No projects are planned for construction in the Levisa Fork basin that would reduce flooding in the Grundy area. Upstream of Grundy and along a portion of U. S. Route 460, the channel of Levisa Fork has been enlarged and some channel banks have been lined with concrete. These modifications were made in conjunction with the recent upgrading of the highway.

Several years ago, local interests cleaned and enlarged the Levisa Fork channel through Grundy. This improvement provides some degree of protection from minor floods, however, regular maintenance must be provided to maintain its primary function for flood height reductions.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is

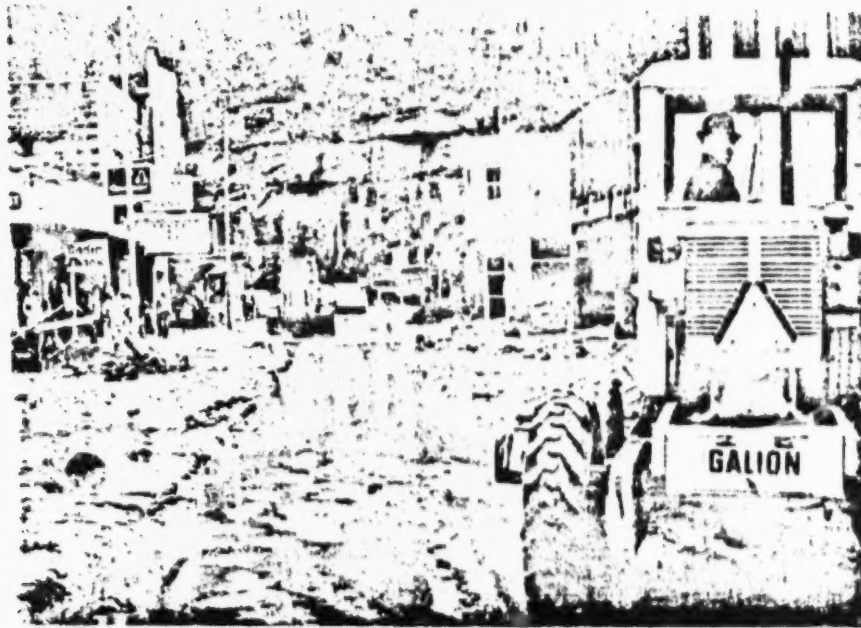


Figure 2 - Flood damage from Levisa Fork and Slate Creek at Main Street Road in Grundy following the April 1977 flood.



Figure 3 - Flood damage at the Rexall Drug Store in downtown Grundy following the April 1977 flood.

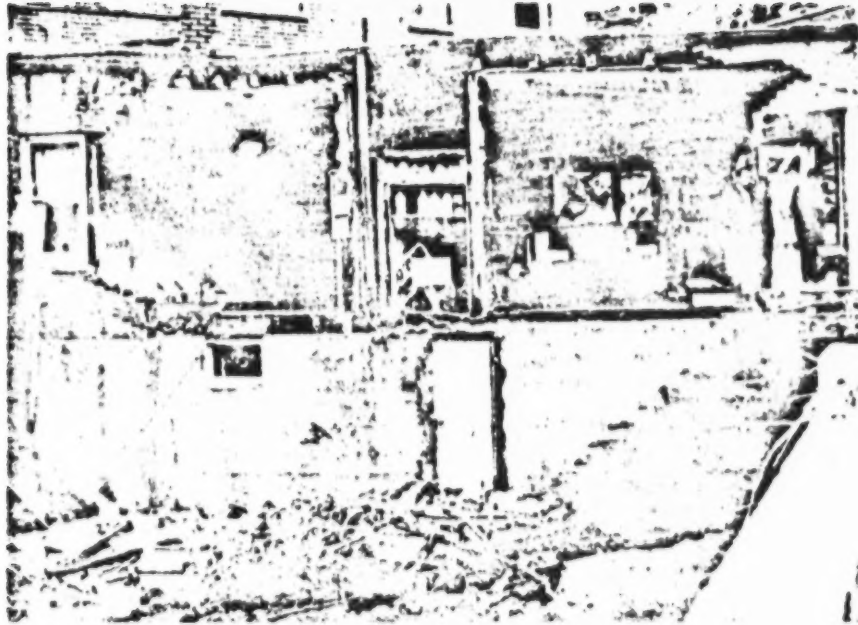


Figure 4 - Flood damage in downtown Grundy at the end of Slate Creek following the April 1977 flood.

approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Natural discharge-frequency curves for Slate Creek were taken from the Flood Plain Information report for Grundy (Reference 1). These data were updated and reanalyzed to conform to present FEMA guidelines. The curves are based on a regional analysis in accordance with the method outlined by Leo R. Beard and the Water Resources Council Bulletin No. 17 (References 4 and 5).

Records of past floods and stream flow measurements used in this study were obtained from the U. S. Geological Survey (USGS) gage located at river mile 140.6 on Levisa Fork upstream of Big Rock. However, this gage was discontinued in September 1974, and a new

gage is being established near Big Rock at approximately river mile 132.6 on Levisa Fork. Records kept since 1940 from the discontinued gage are available.

Twenty USGS stream gaging stations in the surrounding drainage basins displaying similar hydrologic characteristics were used in the regional analysis. Periods of record range from 16 to 60 years and represent drainage areas of 31 to 3,892 square miles. A period of record of 60 years was adopted as being representative and was used in computing the estimated frequency for each evaluation center.

Peak discharges for Levisa Fork were calculated using the Soil Conservation Service (SCS) Technical Release No. 20 computer program (Reference 6). Rainfall values were determined using procedures in Technical Paper No. 40 (Reference 7).

A summary of drainage area-peak discharge relationships for Levisa Fork and Slate Creek is shown in Table 1, "Summary of Discharges".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
LEVISA FORK					
At downstream corporate limits	233.6	32,521	46,149	49,859	63,992
SLATE CREEK					
At the confluence with Levisa Fork	40.5	7,900	13,900	17,000	26,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis for Slate Creek were obtained from aerial photographs taken in April 1978 (Reference 8). The below-water sections were obtained from field measurement. Cross sections for Levisa Fork were field surveyed. All bridges were field checked to obtain elevation data and structural geometry. Cross sections were located at close intervals immediately upstream and downstream of all bridges.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed through the use of the COE HEC-2 step-backwater computer program (Reference 9). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for Levisa Fork were calculated using the slope/area method. Starting water-surface elevations for Slate Creek were determined using the corresponding coincident flood crests on Levisa Fork.

Channel roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the streams and floodplain areas. Roughness "n" values for Levisa Fork channel and overbank areas ranged from 0.030 to 0.055. The channel "n" values for Slate Creek ranged from 0.045 to 0.060, and the overbank "n" values ranged from 0.045 to 0.075.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

For the areas studied by approximate methods, the 100-year flood elevations were developed from normal depth calculations and on-site inspections. The developed 100-year profile was plotted against the stream bottom profile. Average depths were determined along the study reaches. During an on-site inspection, these depths were equated to the actual stream channel and inundation limits were established.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries for Slate Creek were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 40 feet (Reference 10). For Levisa Fork, the boundaries were interpolated using topographic maps at a scale of 1:1,200 with a contour interval of 5 feet (Reference 11).

For the areas studied by approximate methods, the boundary of the 100- year flood was delineated using the topographic maps referenced above (Reference 10).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

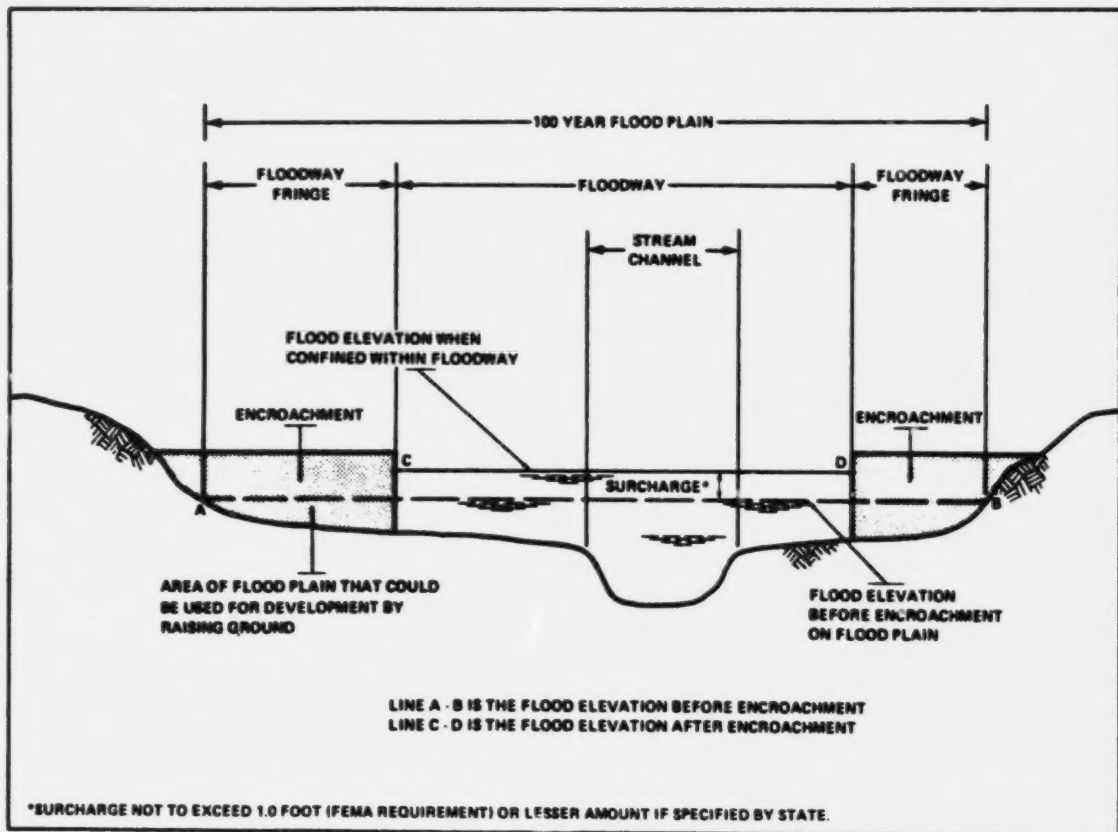
For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 2). The computed floodways are shown on the Flood Insurance Rate Map (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway widths for Levisa Fork extend beyond the corporate limits.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 5.



FLOODWAY SCHEMATIC

Figure 5

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	¹ DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Levisa Fork								
A	80	193 ²	4,270	11.7	1,025.8	1,025.8	1,026.6	0.8
B	1,408	192 ²	4,121	12.1	1,029.3	1,029.3	1,029.8	0.5
C	2,388	189 ²	3,968	12.6	1,030.8	1,030.8	1,031.4	0.6
D	3,338	177 ²	3,431	14.5	1,032.5	1,032.5	1,032.8	0.3
E	4,398	146 ²	2,866	17.4	1,033.9	1,033.9	1,034.3	0.4
F	5,348	149	3,419	14.6	1,038.2	1,038.2	1,038.7	0.5
G	6,418	298	4,755	10.5	1,043.5	1,043.5	1,043.8	0.3
H	7,418	221	3,756	13.3	1,044.3	1,044.3	1,044.6	0.3
I	8,408	190	3,818	13.1	1,046.8	1,046.8	1,047.0	0.2
J	9,408	200	4,015	12.4	1,048.7	1,048.7	1,049.0	0.3
K	10,933	168	3,210	15.5	1,052.2	1,052.2	1,052.3	0.1
L	11,973	214	3,523	14.2	1,055.6	1,055.6	1,056.1	0.5
M	12,993	232	3,193	15.6	1,057.7	1,057.7	1,058.2	0.5
N	14,003	281	4,579	10.9	1,064.6	1,064.6	1,064.6	0.0
O	15,003	149	3,315	15.0	1,066.2	1,066.2	1,066.2	0.0
P	15,918	317	5,031	9.9	1,070.9	1,070.9	1,071.6	0.7
Q	17,093	228	4,667	10.7	1,073.3	1,073.3	1,074.2	0.9
R	19,113	184	4,010	12.2	1,077.9	1,077.9	1,078.5	0.6
S	2,0083	272	4,506	10.8	1,079.4	1,079.4	1,079.7	0.3
T	20,613	203	3,892	12.6	1,080.0	1,080.0	1,080.3	0.3

¹Feet above corporate limits

²This width extends beyond corporate limits

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF GRUNDY, VA
(BUCHANAN CO.)

FLOODWAY DATA

LEVISA FORK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	¹ DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY	INCREASE
Slate Creek								
A	0.109	510	1,637	10.4	1,050.6	1,050.2 ²	1,050.2	0.0
B	0.177	350	2,226	7.6	1,052.4	1,052.4	1,052.4	0.0
C	0.268	250	1,476	11.5	1,058.5	1,058.5	1,058.6	0.1
D	0.335	309	2,408	7.1	1,062.0	1,062.0	1,062.6	0.6
E	0.444	183	1,730	9.8	1,067.7	1,067.7	1,068.6	0.9
F	0.610	319	2,428	7.0	1,075.9	1,075.9	1,076.6	0.7
G	0.742	109	1,288	13.2	1,082.2	1,082.2	1,083.2	1.0
H	0.857	152	1,080	15.7	1,086.6	1,086.6	1,086.8	0.2
I	1.000	265	2,572	6.6	1,092.7	1,092.7	1,093.5	0.8
J	1.161	152	1,982	8.6	1,094.6	1,094.6	1,095.3	0.7
K	1.289	166	1,498	11.3	1,096.7	1,096.7	1,097.2	0.5
L	1.417	88	977	17.4	1,101.2	1,101.2	1,101.6	0.4

¹Miles above confluence with Levisa Fork

²Elevation computed without consideration of backwater effects from Levisa Fork

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF GRUNDY, VA
(BUCHANAN CO.)

FLOODWAY DATA

SLATE CREEK

Floodwaters from Levisa Fork and Slate Creek were found to have hazardous velocities. Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. To provide guidance for encroachment into these areas, a proposed floodway is delineated for that part of the 100-year flood plain that conveys flow.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 2 for certain downstream cross sections of Slate Creek are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from Levisa Fork.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 10-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

In January 1971, the COE published a Flood Plain Information report for Levisa Fork and its tributaries (Reference 1). This report presented profiles of the 100-year flood and the March 1963 flood along Levisa Fork and Slate Creek through Grundy. The 100-year profile for Levisa Fork as shown in the report is in agreement in most reaches with the profile contained in this study. It, however, does vary a few feet in the downtown Grundy area. This variance resulted from increased discharges for the 100-year flood due to updated frequency determinations. Changes in channel conditions and modifications to the HEC-2 computer program also caused the two profiles to differ. The 100-year profile for Slate Creek in the Flood Plain Information report is two to three feet higher in several locations than the profile shown in this study. Channel and bridge modifications along the stream account for the lower profile in this study. Also, changes made in the HEC-2 program during the period between the two studies resulted in some reductions to the profile in this study.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

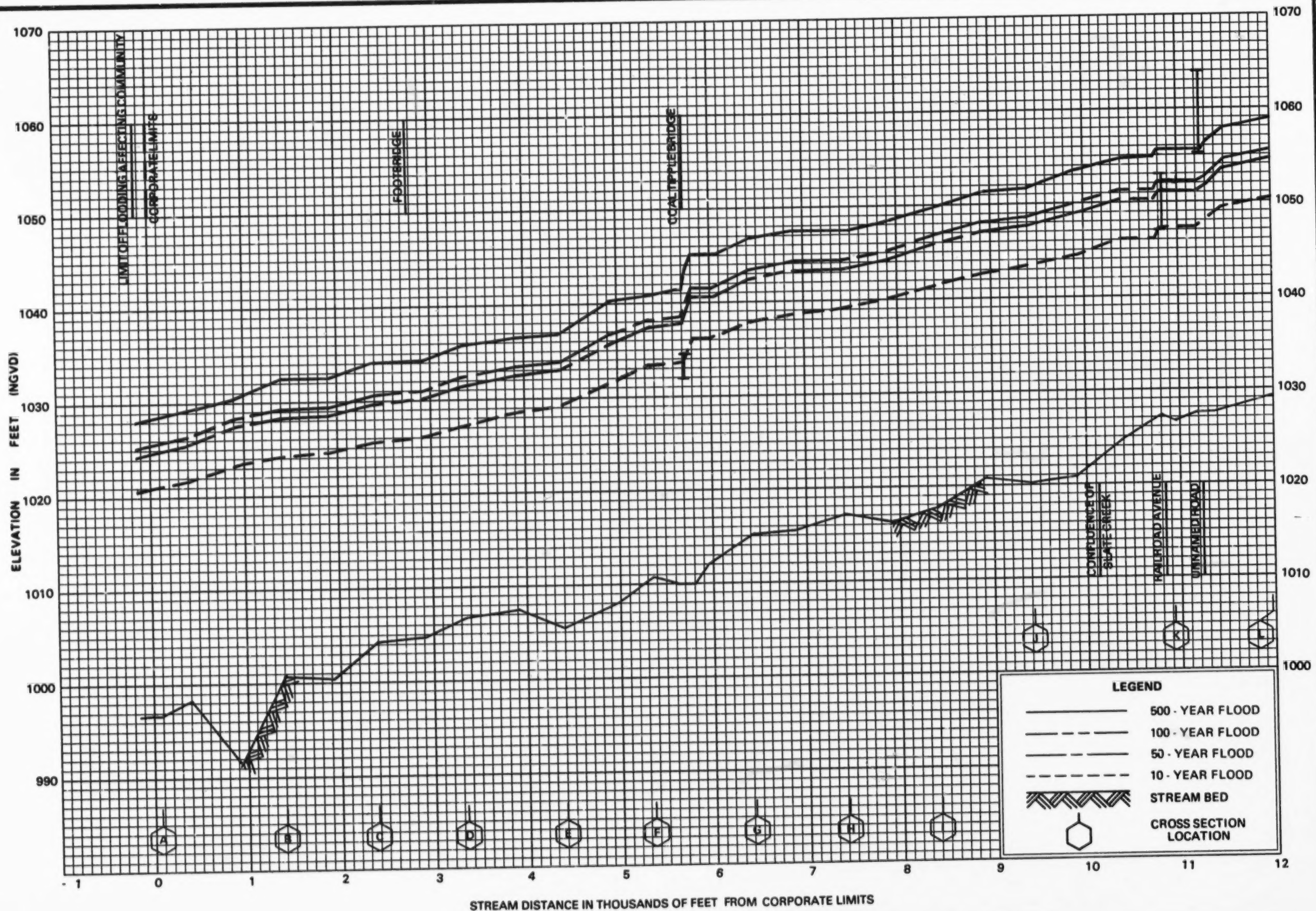
9.0 BIBLIOGRAPHY AND REFERENCES

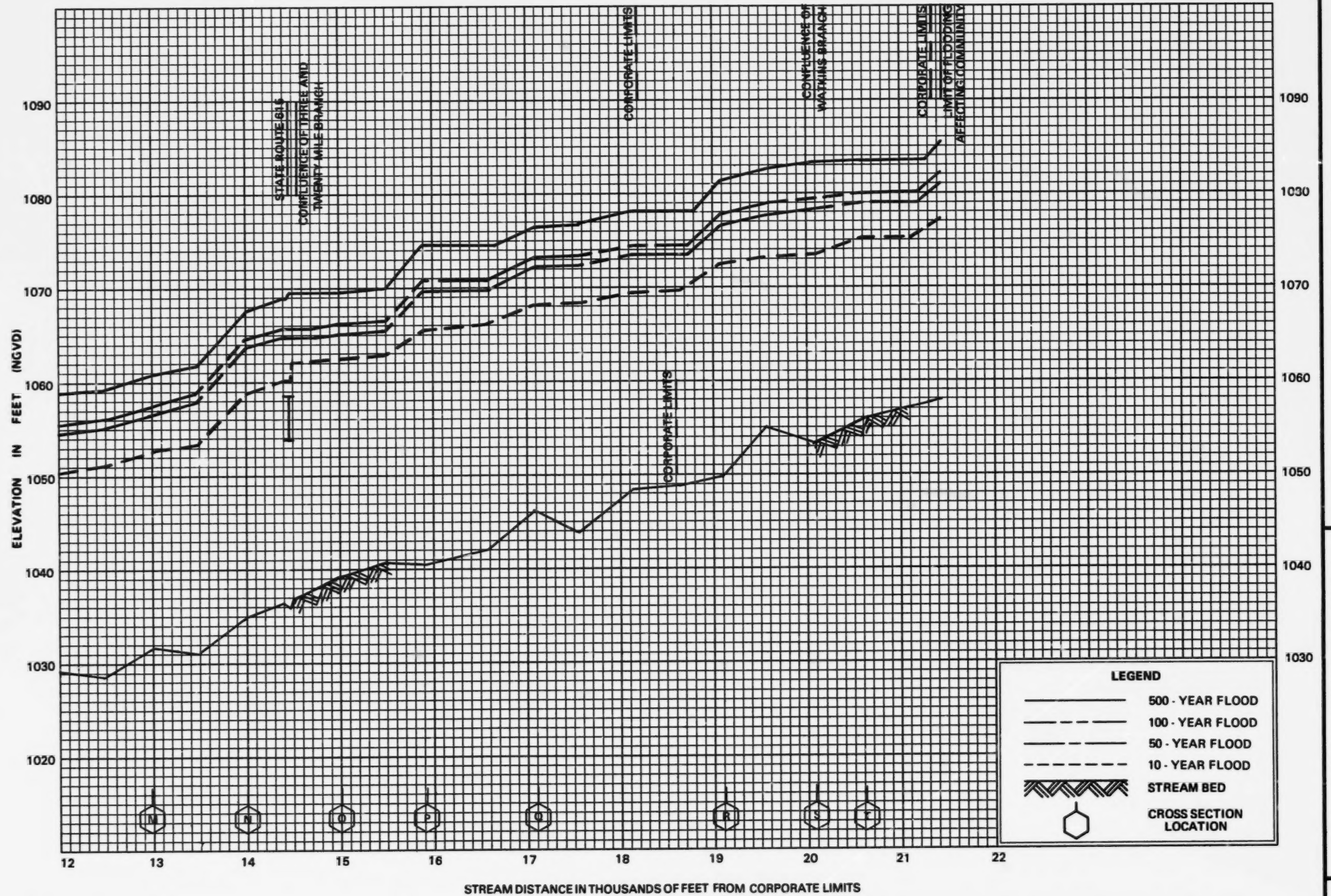
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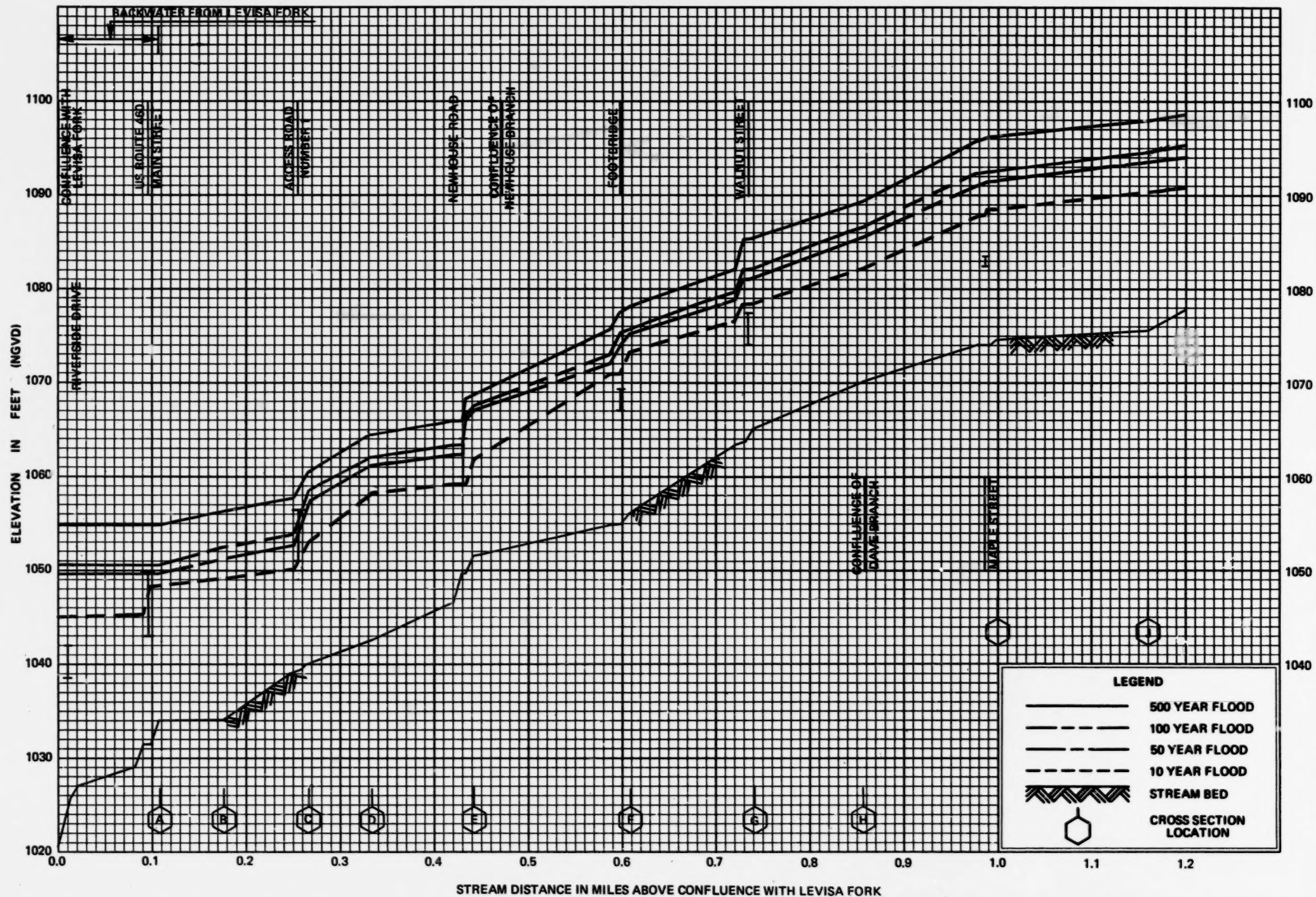
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EXHIBIT 3 - ELEVATION REFERENCE MARKS

<u>Reference Mark</u>	<u>Elevation (Feet NGVD)</u>	<u>Description of Location</u>
RM 1	1,049.808	Standard tablet, stamped 1050 VA, set in north end of fourth step of Buchanan County Courthouse on Walnut Street, approximately 75.0 feet east along Walnut Street from intersection of U. S. Route 460.
RM 2	1,027.72	Chiseled cross cut in sandstone block at southeast end of stone wall at residence located approximately 25 feet northeast of U. S. Route 460, and approximately 350 feet northwest along U. S. Route 460 from intersection of Hill Street.
RM 3	1,054.545	Standard USC&GS disk, stamped Y432, set in top of northeast wing wall of Hoot Owl Road bridge over Levisa Fork.
RM 4	1,075.746	Standard USC&GS disk, stamped Z432, set in northeast headwall of Watkins Branch culvert under U. S. Route 460.





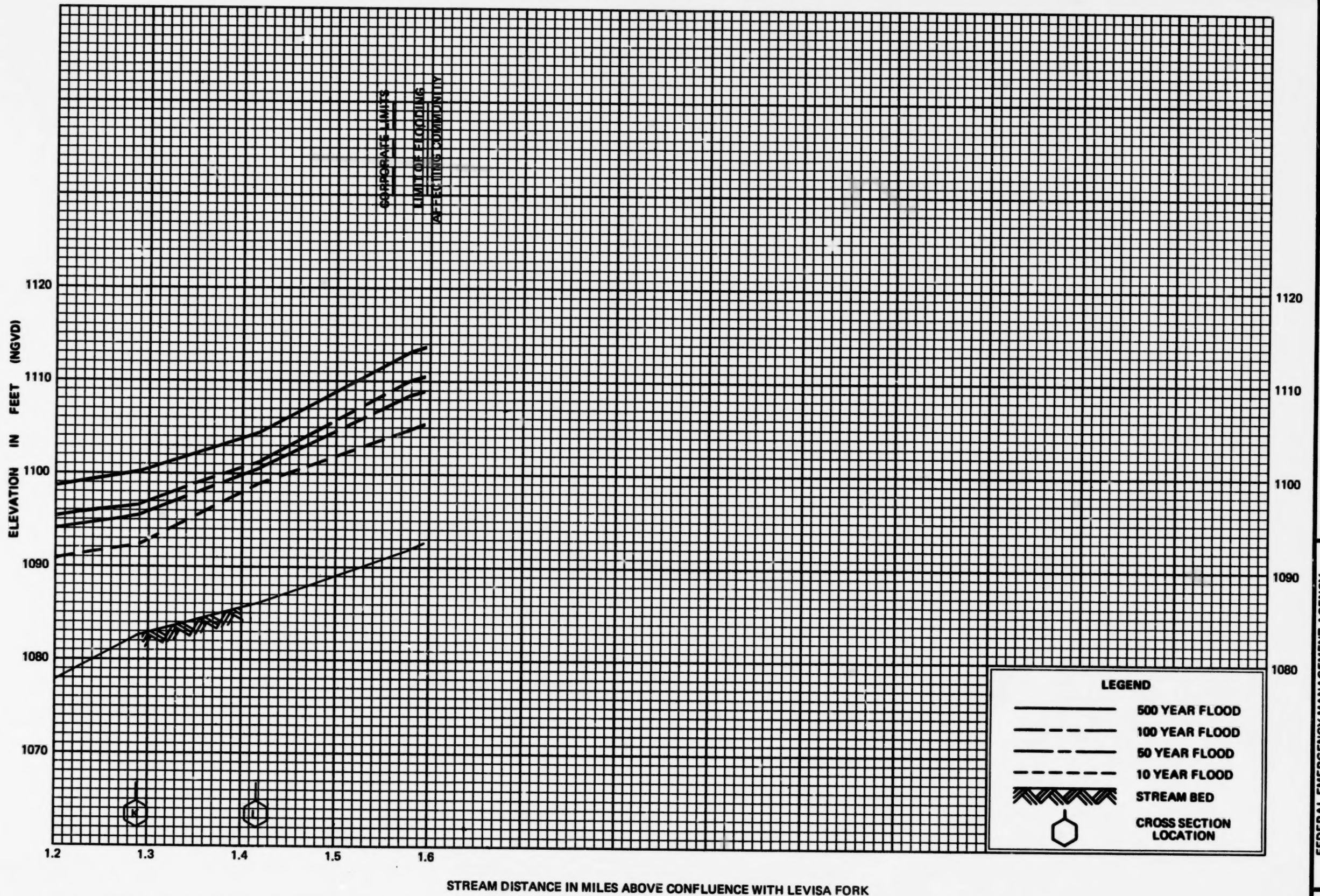


FLOOD PROFILES

SLATE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF GRUNDY, VA
(BUCHANAN CO.)



FLOOD PROFILES

SLATE CREEK

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